



*U.S. Army School of Aviation Medicine*

---

# **Aviation Protective Equipment**

# *Terminal Learning Objective*

---

- ◆ ACTION: Employ aviation protective equipment
- ◆ CONDITION: While performing as an aircrew member
- ◆ STANDARD: IAW AR 95-1, AR 670-1 (ALARACT 177/2010 dated Jun '10), USAARL Report #93-15 and applicable Technical Manuals



# *ELO A*

---

- ◆ ACTION: Identify the safety features provided by aviation protection equipment
- ◆ CONDITION: Given a list
- ◆ STANDARD: Select appropriate safety equipment and safety features associated with aviation equipment



# *Aircraft Protective Devices*

---

- ◆ Structural shell and landing gear
- ◆ Landing gear & crashworthy seats
- ◆ Personnel restraint system
- ◆ Post crash factors





# *Structural Shell*

---



# *Landing Gear*

---





# *Post Crash Factors*

---



# *Post Crash Factors*

- ◆ Self Sealing Fuel Tanks
- ◆ Break Away Fuel Lines



U.S. Patent June 15, 1976

3,963,055

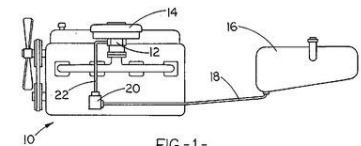


FIG-1-

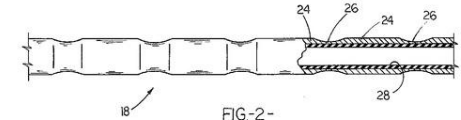


FIG-2-

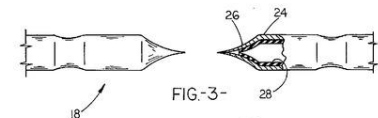


FIG-3-

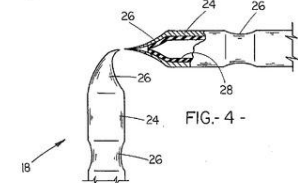


FIG-4 -



# ***ELO B***

---

- ◆ ACTION: Identify the characteristics of and wear of flight clothing
- ◆ CONDITION: Given a list
- ◆ STANDARD: Select the garments authorized for aviation duties, the characteristics of and the correct wear of those garments



# *Nomex Characteristics*

---

- ◆ Does NOT support combustion
- ◆ Chars, does NOT melt or drip
- ◆ Good chemical resistance
- ◆ More durable than cotton
- ◆ Low thermal conduction
- ◆ Comfortable to wear



# *Flight Suit*

---

Inside of flight suit



Outside of flight suit





# *Unauthorized Flight Clothing*

---





# *Gortex Jacket*

---



# *Burns to the Back of Neck*

- ◆ Collar was NOT worn up





UNCLASSIFIED

# *Unauthorized Name Tag*

---



UNCLASSIFIED

# *Thermal Protection*



# *Authorize Undergarments*

---

- ◆ Wear issued type
- ◆ 100% cotton
- ◆ 100% wool
- ◆ Nomex
- ◆ Any combination of three blends





# *11 Seconds to Egress!!!*



# *Tissue Damaged From Fire*

---





# *Identification Tags*

---



- ◆ Worn around the neck while flying
- ◆ Tucked between blouse and t-shirt (outside of collar)
- ◆ NO silencers/covers (550 cord or plastic)



# *Boot Characteristics*

---

- ◆ Retention
- ◆ Stability
- ◆ Protection for feet and ankles
- ◆ Fire retardancy
- ◆ Non-all leather boots must have upper construction of NOMEX, cotton and leather
- ◆ All boots must have AWR

# *Wear of Boots*

---

- ◆ Laced to top
- ◆ Avoid zippers, or straps
- ◆ NO Jungle boots or Jump boots



# *Authorized Boots for Wear*

---

- ◆ Belleville- 790 and 795
- ◆ Belleville- 300 DES ST, 340 DES Hot Weather Boot
- ◆ Bates-wolverine boots
- ◆ Welco boots
- ◆ Army Combat Boot Temperate Weather (ACB-TW)
- ◆ Commercially available boots must have an Air Worthiness Release (AWR) after being tested for adequate protective qualities

Consult [www.safety.army.mil](http://www.safety.army.mil) for latest updates



# *Nomex Flight Gloves*

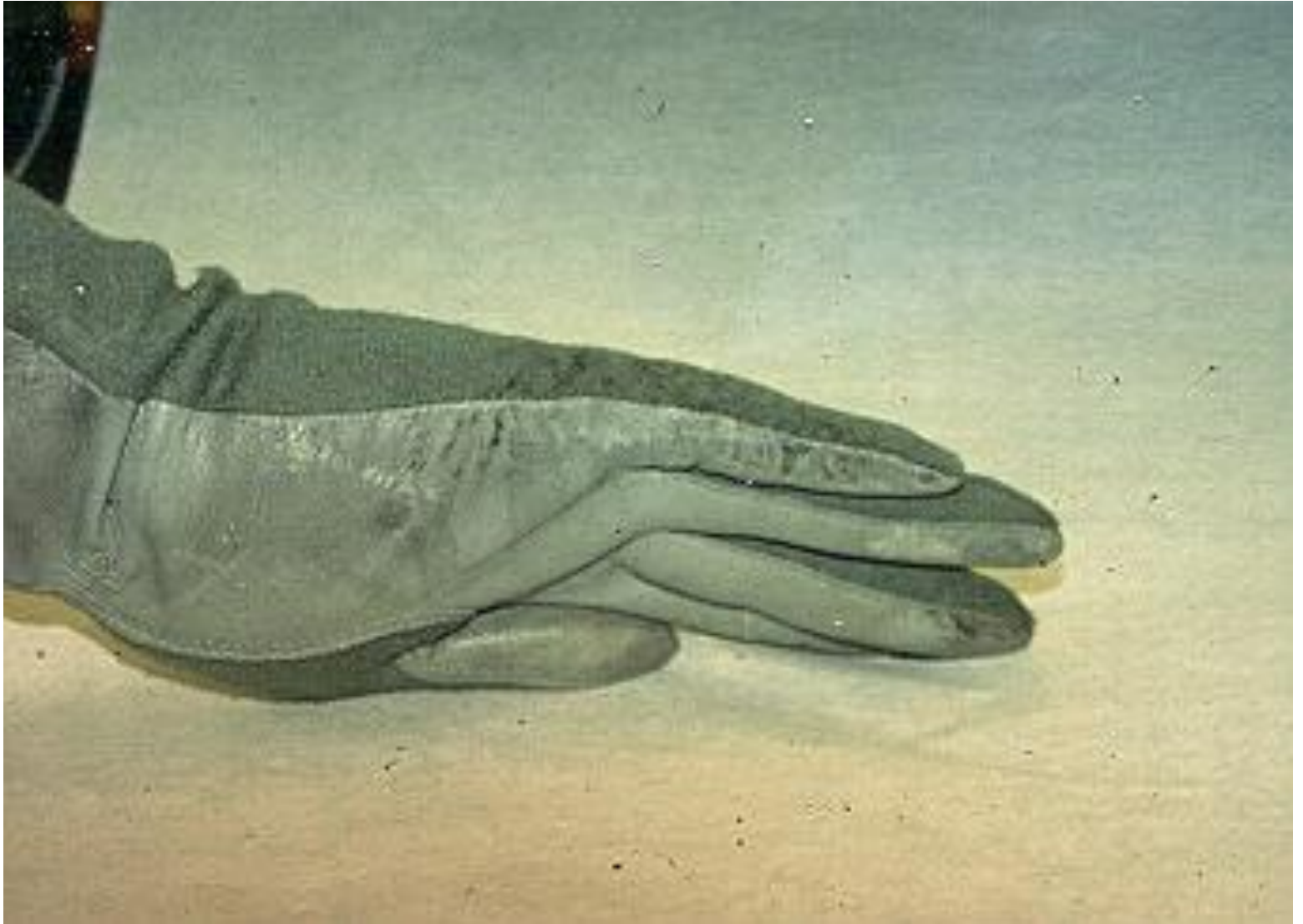
---

- ◆ Insulation - Reduces heat transfer
- ◆ Comfort
- ◆ Sensitivity - Improves tactile identification



# *Egressed Quickly Receiving Minor Injuries*

---



# *11 Seconds to Egress, Causing Major Injuries*

---





# *HGU-56/P Helmets*

---

- ◆ Custom fit by ALSE
- ◆ Dual visor / better retention system
- ◆ Ensure chin strap and nape strap are tight
- ◆ Earplugs or CEP's



# *HGU-56/P Helmets*

---

- ◆ All maintenance or modification performed by ALSE Technician
- ◆ Clean with mild soap and water
- ◆ Do NOT store in POV
- ◆ Store in helmet bag



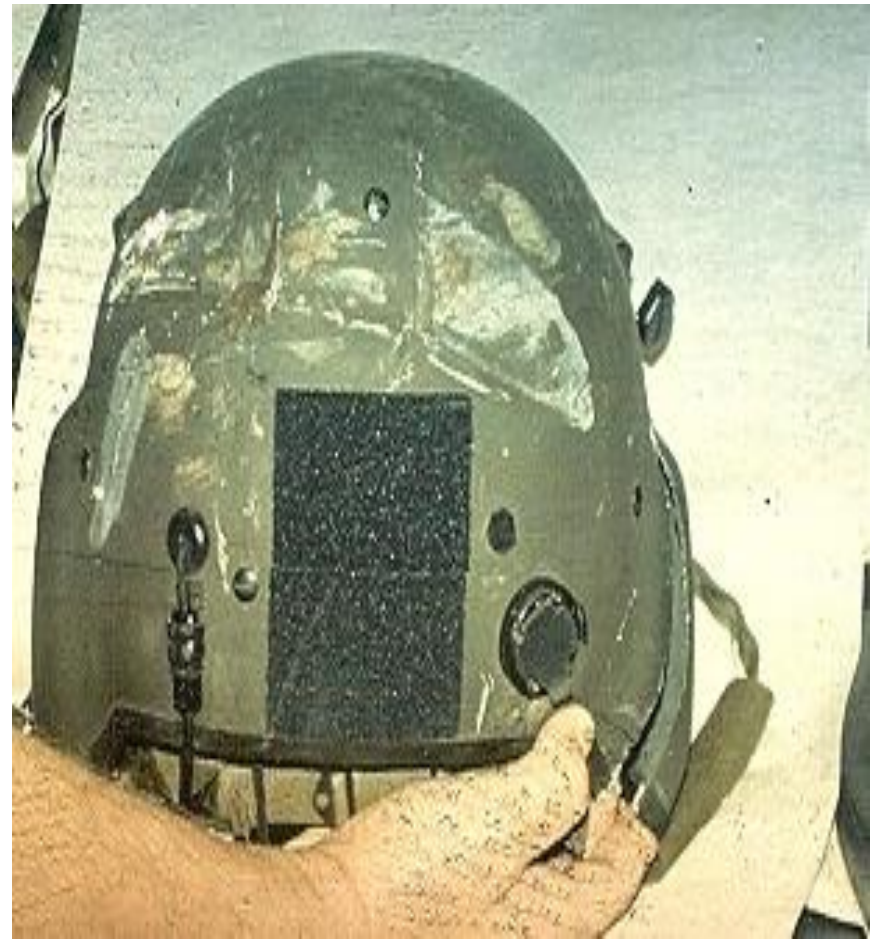
# *Helmet Saved Crew Member's Life*

---

Left rear



Rear





# *Bird Strike and Helmet Visors*

---



# *Helmet Visor Saved Pilot's Vision*

---

Visor stayed intact



Visor chipped and pitted



# *ELO C*

---

- ◆ ACTION: Identify the maintenance procedures for flight clothing
- ◆ CONDITION: Given a list
- ◆ STANDARD: Select the appropriate maintenance procedures for flight clothing and equipment



# *Care of the AACU*

---

- ◆ Avoid unnecessary wear during ground duties
- ◆ Avoid contact with POL products
- ◆ Wash on a permanent press cycle
- ◆ Do NOT bleach or starch
- ◆ Wash and dry at temps less than 130°
- ◆ NO liquid fabric softener
- ◆ Do NOT dry clean or commercially hot press
- ◆ NOMEX may be ironed, but do not iron the Velcro tabs

# *Care of Nomex Flight Gloves*

---

- ◆ Avoid unnecessary contact with POL products (preflight)
- ◆ Wash gloves with mild soap, do NOT use bleach
- ◆ Wash at temps less than 120°
- ◆ Do NOT tumble dry, remove excess water by squeezing or rolling in a towel, Do NOT wring or twist
- ◆ Lay flat to air dry, out of the direct sun or heat

# *ELO D*

---

- ◆ ACTION: Identify components and care of the Air Warrior system
- ◆ CONDITION: Given a list
- ◆ STANDARD: Select the characteristics and care of Air Warrior equipment and correctly identify the purpose of using this system





# *Primary Survival Gear Carrier (PSGC)*

---

- ◆ Commonly known as “ALSE vest”
- ◆ Approximately 25 pounds with issued equipment
- ◆ One size, must be fitted to aviator
- ◆ Must be stocked, inspected and have forms/records maintained by qualified ALSE personnel



# *PSGC (cont)*

---



# *Contents (PSGC)*



## **First Aid Platform**





# *Air Warrior Pockets (PSGC)*



# *First Aid Items*

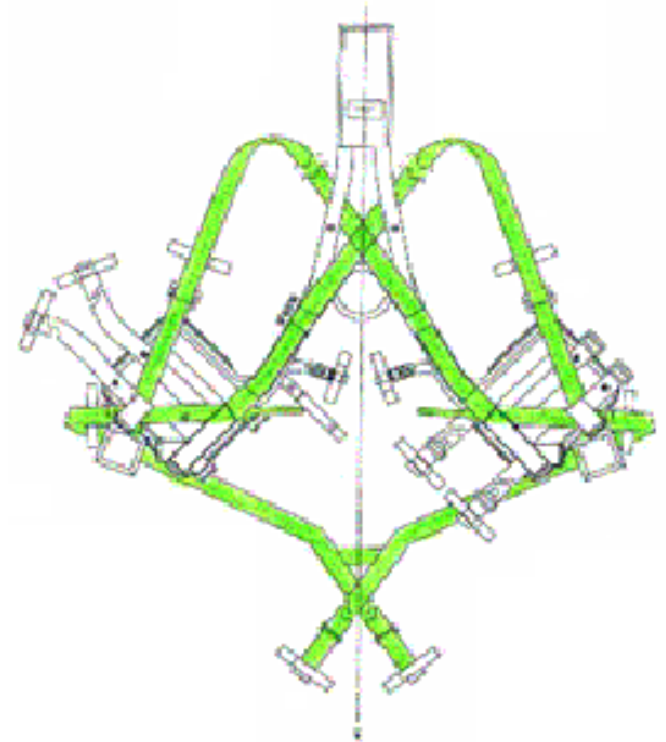


# *Signaling platform*





# *Personal Restraint Tether*



# *Body Armor*



◆ Issued to units in high threat areas

◆ Comes in 5 sizes



◆ Composed of Kevlar and has ballistic upgrade "plates"



# ***WARNING***

---

- ◆ **Do NOT soak soft ballistic inserts in water or use bleach or starch**
- ◆ **The Air Warrior ballistic insert has a water-repellent treatment and a water-resistant casing to assist with preserving the ballistic capability. It is the user's responsibility to use good sense in further reducing the moisture risk by keeping the ballistic inserts dry**
- ◆ **If dropped or suspected to have been dropped, have the plates inspected and/or replaced**



# *Holster*

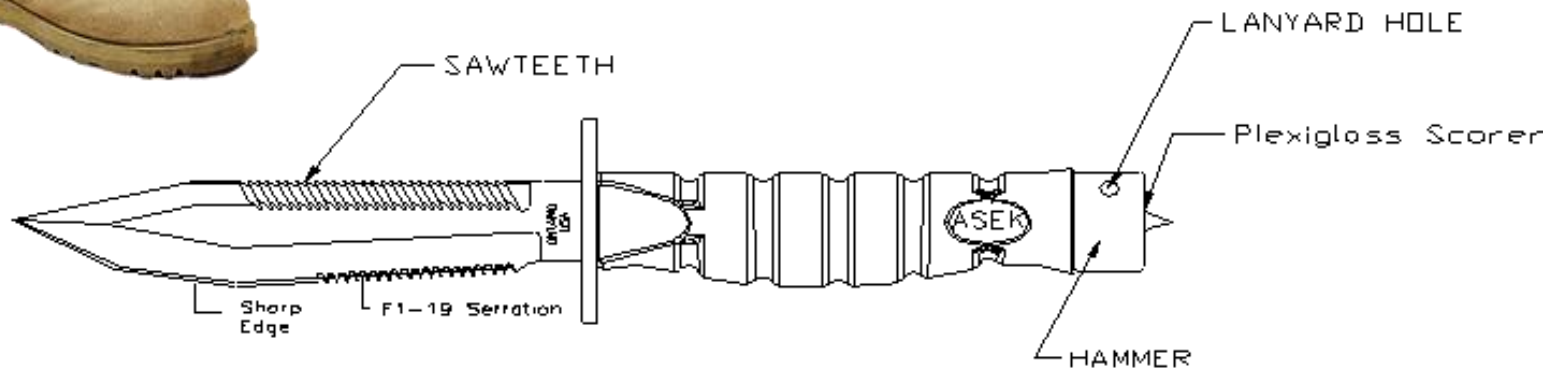


- ◆ 3 Configurations  
(over-the-shoulder,  
hip & drop-leg)

- ◆ Magazine pouches  
(1 & 2 magazine)



# *Aircrew Survival and Egress Knife (ASEK)*



# *Army Combat Shirt (ACS)*

---



- ◆ Flame resistant, long-sleeved shirt, replaces the T-shirt and blouse
- ◆ Worn under body armor
- ◆ Authorized for use in specific geographic areas when required by climatic conditions
- ◆ Must have pen/pencil pocket flap or must remove pens/pencils before flight



## *Fire Resistant Environmental Ensemble (FREE)*

---

- ◆ Aviation approved system
- ◆ Modular, scalable to climate
- ◆ Moisture wicking, antimicrobial fibers
- ◆ Fleeces, undergarments, and outer-garments
- ◆ Issued to aviators in specific (cold weather) areas

UNCLASSIFIED

# *Over Water*

---



UNCLASSIFIED

# *Microclimate Cooling System*



- ◆ Reduces heat stress to crewmembers
- ◆ Increases mission endurance by 350% (from 1.6 hours to 5.7 hours)
- ◆ Vest and cooling unit that pumps chilled water through small tubes
- ◆ Has a quick disconnect, allowing safe, quick egress



# *ELO E*

---

- ◆ ACTION: Identify miscellaneous unsafe apparel
- ◆ CONDITION: Given a list
- ◆ STANDARD: Correctly match apparel that is unsafe in the aviation environment with the threat that it creates



# *Miscellaneous Apparel*

---

- ◆ Rings can cause severe injuries
- ◆ Metal badges can cause electrical burns or create Foreign Object Damage (FOD) hazard
- ◆ Metal badges must be removed prior to entry onto the flight line, or when working in or around aircraft
- ◆ Shoulder Sleeve insignia will be removed by all aircrew members prior to entry onto the flight line, or working in or around aircraft

# *Partial Degloving*





# *Complete Degloving*



# *Check on Learning*

---

- ◆ What are some the safety features provided by army aircraft?
  - ▶ Structural shell, crashworthy seats, and personnel restraint system
- ◆ At what temperature should flight gloves be washed?
  - ▶ Temperature at 120 degrees or less
- ◆ Select apparel that is unsafe to wear
  - ▶ Metal pin-on insignia, badges, rings

# *Summary*

---

- ◆ Aircraft protective devices
- ◆ Characteristic and wear of flight clothing
- ◆ Maintenance procedure of flight clothing
- ◆ Air Warrior system
- ◆ Miscellaneous unsafe apparel

